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PTO/SB/21 (08-00)

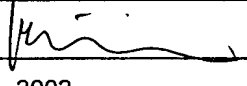
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<h1>TRANSMITTAL FORM</h1> <p>(to be used for all correspondence after initial filing)</p>	<b>Application Number</b>	10/092,178
	<b>Filing Date</b>	March 5, 2002
	<b>First Named Inventor</b>	Teng Pin Poo, et al.
	<b>Group Art Unit</b>	
	<b>Examiner Name</b>	
<b>Total Number of Pages in This Submission</b>	34	<b>Attorney Docket Number</b> 1601457-0013

ENCLOSURES (check all that apply)		
<input type="checkbox"/> Fee Transmittal Form <input type="checkbox"/> Fee Attached <input type="checkbox"/> Amendment / Reply <input type="checkbox"/> After Final <input type="checkbox"/> Affidavits/declaration(s) <input type="checkbox"/> Extension of Time Request <input type="checkbox"/> Express Abandonment Request <input type="checkbox"/> Information Disclosure Statement <input checked="" type="checkbox"/> Certified Copy of Priority Document(s) <input type="checkbox"/> Response to Missing Parts/Incomplete Application <input type="checkbox"/> Response to Missing Parts under 37 CFR 1.52 or 1.53	<input type="checkbox"/> Assignment Papers (for an Application) <input type="checkbox"/> Drawing(s) <input type="checkbox"/> Licensing-related Papers <input type="checkbox"/> Petition <input type="checkbox"/> Petition to Convert to a Provisional Application <input type="checkbox"/> Power of Attorney, Revocation Change of Correspondence Address <input type="checkbox"/> Terminal Disclaimer <input type="checkbox"/> Request for Refund <input type="checkbox"/> CD, Number of CD(s) _____	<input type="checkbox"/> After Allowance Communication to Group <input type="checkbox"/> Appeal Communication to Board of Appeals and Interferences <input type="checkbox"/> Appeal Communication to Group (Appeal Notice, Brief, Reply Brief) <input type="checkbox"/> Proprietary Information <input type="checkbox"/> Status Letter <input checked="" type="checkbox"/> Other Enclosure(s) (please identify below): <div style="margin-left: 20px;">Return Postcard</div>
<div style="border: 1px solid black; padding: 5px; min-height: 100px;"> <b>Remarks</b> </div>		

SIGNATURE OF APPLICANT, ATTORNEY, OR AGENT	
Firm or Individual name	White & Case LLP Patrick Ma, Reg. No. 44,215
Signature	
Date	April 4, 2002

CERTIFICATE OF MAILING			
I hereby certify that this correspondence is being deposited with the United States Postal Service with sufficient postage as first class mail in an envelope addressed to: Commissioner for Patents, Washington, DC 20231 on this date: <span style="border: 1px solid black; padding: 2px;">April 4, 2002</span>			
Typed or printed name	Christina Ishihara		
Signature		Date	April 4, 2002

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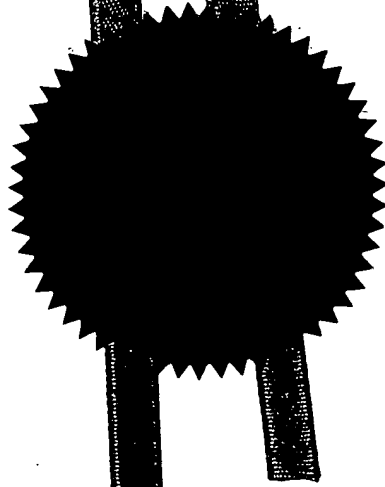

**REGISTRY OF PATENTS  
SINGAPORE**

This is to certify that the annexed is a true copy of the following Singapore patent application as filed in this Registry.

Date of Filing : 07 FEB 2002  
Application number : PCT/SG02/00021  
Applicants : S-COM SYSTEM (S) PTE LTD  
Title of Invention : A PORTABLE DATA STORAGE AND IMAGE  
RECORDING DEVICE CAPABLE OF DIRECT  
CONNECTION TO A COMPUTER USB PORT

I further certify that the annexed documents are not, as yet, open to public inspection.

**CERTIFIED COPY OF  
PRIORITY DOCUMENT**

  
  
Sharmaine Wu Shee Mei (Ms)  
Assistant Registrar  
for REGISTRAR OF PATENTS  
SINGAPORE

19 Mar 2002

**PCT**  
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**REQUEST**

The undersigned requests that the present international application be processed according to the Patent Cooperation Treaty.

For receiving Office use only	
<b>PCT/SG 0 2 / 0 0 0 2 1</b>	
International Application No.	
<b>7 FEB 2002</b> (07.02.02)	
International Filing Date	
<b>REGISTRY OF PATENTS (SINGAPORE)</b> <b>PCT INTERNATIONAL APPLICATION</b>	
Name of receiving Office and "PCT International Application"	
Applicant's or agent's file reference (if desired) (12 characters maximum) <b>FP1499</b>	

<b>Box No. I TITLE OF INVENTION</b> A PORTABLE DATA STORAGE AND IMAGE RECORDING DEVICE CAPABLE OF DIRECT CONNECTION TO A COMPUTER USB PORT	
<b>Box No. II APPLICANT</b> <input type="checkbox"/> This person is also inventor	
Name and address: (Family name followed by given name; for a legal entity, full official designation. The address must include postal code and name of country. The country of the address indicated in this Box is the applicant's State (that is, country) of residence if no State of residence is indicated below.)  <b>S-Com System (S) Pte Ltd</b> <b>30 Loyang Way #07-13/14/15</b> <b>Loyang Industrial Estate</b> <b>Singapore 508769</b>	Telephone No.  Facsimile No.  Teleprinter No.  Applicant's registration No. with the Office
State (that is, country) of nationality: <b>Singapore</b>	State (that is, country) of residence: <b>Singapore</b>
This person is applicant for the purposes of: <input type="checkbox"/> all designated States <input checked="" type="checkbox"/> all designated States except the United States of America <input type="checkbox"/> the United States of America only <input type="checkbox"/> the States indicated in the Supplemental Box	
<b>Box No. III FURTHER APPLICANT(S) AND/OR (FURTHER) INVENTOR(S)</b>	
Name and address: (Family name followed by given name; for a legal entity, full official designation. The address must include postal code and name of country. The country of the address indicated in this Box is the applicant's State (that is, country) of residence if no State of residence is indicated below.)  <b>POO Teng Pin</b> <b>Apt Blk 44 Bedok South Road #11-763</b> <b>Singapore 460044</b>	This person is: <input type="checkbox"/> applicant only <input checked="" type="checkbox"/> applicant and inventor <input type="checkbox"/> inventor only (If this check-box is marked, do not fill in below.)  Applicant's registration No. with the Office
State (that is, country) of nationality: <b>Malaysia</b>	State (that is, country) of residence: <b>Singapore</b>
This person is applicant for the purposes of: <input type="checkbox"/> all designated States <input type="checkbox"/> all designated States except the United States of America <input checked="" type="checkbox"/> the United States of America only <input type="checkbox"/> the States indicated in the Supplemental Box	
<input checked="" type="checkbox"/> Further applicants and/or (further) inventors are indicated on a continuation sheet.	
<b>Box No. IV AGENT OR COMMON REPRESENTATIVE; OR ADDRESS FOR CORRESPONDENCE</b>	
The person identified below is hereby/has been appointed to act on behalf of the applicant(s) before the competent International Authorities as: <input checked="" type="checkbox"/> agent <input type="checkbox"/> common representative	
Name and address: (Family name followed by given name; for a legal entity, full official designation. The address must include postal code and name of country.)  <b>WATKIN, Timothy Lawrence</b> <b>Lloyd Wise</b> <b>Tanjong Pagar P O Box 636</b> <b>Singapore 910816</b>	Telephone No. <b>65 227 8986</b>  Facsimile No. <b>65 227 3898</b>  Teleprinter No.  Agent's registration No. with the Office
<input type="checkbox"/> Address for correspondence: Mark this check-box where no agent or common representative is/has been appointed and the space above is used instead to indicate a special address to which correspondence should be sent.	

**Continuation of Box No. III FURTHER APPLICANT(S) AND/OR (FURTHER) INVENTOR(S)***If none of the following sub-boxes is used, this sheet should not be included in the request.*

Name and address: (Family name followed by given name; for a legal entity, full official designation. The address must include postal code and name of country. The country of the address indicated in this Box is the applicant's State (that is, country) of residence if no State of residence is indicated below.)

KUAN Mun Kwong  
Apt Blk 3 Marine Terrace #21-286  
Singapore 440003

This person is:

- ☐ applicant only  
☒ applicant and inventor  
☐ inventor only (If this check-box is marked, do not fill in below.)

Applicant's registration No. with the Office

State (that is, country) of nationality:

Singapore

State (that is, country) of residence:

Singapore

This person is applicant for the purposes of:

☐ all designated States☐ all designated States except the United States of America☒ the United States of America only☐ the States indicated in the Supplemental Box

Name and address: (Family name followed by given name; for a legal entity, full official designation. The address must include postal code and name of country. The country of the address indicated in this Box is the applicant's State (that is, country) of residence if no State of residence is indicated below.)

This person is:

- ☐ applicant only  
☐ applicant and inventor  
☐ inventor only (If this check-box is marked, do not fill in below.)

Applicant's registration No. with the Office

State (that is, country) of nationality:

State (that is, country) of residence:

This person is applicant for the purposes of:

☐ all designated States☐ all designated States except the United States of America☐ the United States of America only☐ the States indicated in the Supplemental Box

Name and address: (Family name followed by given name; for a legal entity, full official designation. The address must include postal code and name of country. The country of the address indicated in this Box is the applicant's State (that is, country) of residence if no State of residence is indicated below.)

This person is:

- ☐ applicant only  
☐ applicant and inventor  
☐ inventor only (If this check-box is marked, do not fill in below.)

Applicant's registration No. with the Office

State (that is, country) of nationality:

State (that is, country) of residence:

This person is applicant for the purposes of:

☐ all designated States☐ all designated States except the United States of America☐ the United States of America only☐ the States indicated in the Supplemental Box

Name and address: (Family name followed by given name; for a legal entity, full official designation. The address must include postal code and name of country. The country of the address indicated in this Box is the applicant's State (that is, country) of residence if no State of residence is indicated below.)

This person is:

- ☐ applicant only  
☐ applicant and inventor  
☐ inventor only (If this check-box is marked, do not fill in below.)

Applicant's registration No. with the Office

State (that is, country) of nationality:

State (that is, country) of residence:

This person is applicant for the purposes of:

☐ all designated States☐ all designated States except the United States of America☐ the United States of America only☐ the States indicated in the Supplemental Box

☐ Further applicants and/or (further) inventors are indicated on another continuation sheet.

**Box No. V DESIGNATION OF STATES***Mark the applicable check-boxes below; at least one must be marked.*

The following designations are hereby made under Rule 4.9(a):

**Regional Patent**

- ☒ **AP ARIPO Patent:** GH Ghana, GM Gambia, KE Kenya, LS Lesotho, MW Malawi, MZ Mozambique, SD Sudan, SL Sierra Leone, SZ Swaziland, TZ United Republic of Tanzania, UG Uganda, ZW Zimbabwe, and any other State which is a Contracting State of the Harare Protocol and of the PCT
- ☒ **EA Eurasian Patent:** AM Armenia, AZ Azerbaijan, BY Belarus, KG Kyrgyzstan, KZ Kazakhstan, MD Republic of Moldova, RU Russian Federation, TJ Tajikistan, TM Turkmenistan, and any other State which is a Contracting State of the Eurasian Patent Convention and of the PCT
- ☒ **EP European Patent:** AT Austria, BE Belgium, CH & LI Switzerland and Liechtenstein, CY Cyprus, DE Germany, DK Denmark, ES Spain, FI Finland, FR France, GB United Kingdom, GR Greece, IE Ireland, IT Italy, LU Luxembourg, MC Monaco, NL Netherlands, PT Portugal, SE Sweden, TR Turkey, and any other State which is a Contracting State of the European Patent Convention and of the PCT
- ☒ **OA OAPI Patent:** BF Burkina Faso, BJ Benin, CF Central African Republic, CG Congo, CI Côte d'Ivoire, CM Cameroon, GA Gabon, GN Guinea, GW Guinea-Bissau, ML Mali, MR Mauritania, NE Niger, SN Senegal, TD Chad, TG Togo, and any other State which is a member State of OAPI and a Contracting State of the PCT (if other kind of protection or treatment desired, specify on dotted line) .....

**National Patent** (if other kind of protection or treatment desired, specify on dotted line):

- |   |  |  |
|---|--|--|
| <input checked="" type="checkbox"/> AE United Arab Emirates               | <input checked="" type="checkbox"/> GH Ghana                                     | <input checked="" type="checkbox"/> MX Mexico                      |
| <input checked="" type="checkbox"/> AG Antigua and Barbuda                | <input checked="" type="checkbox"/> GM Gambia                                    | <input checked="" type="checkbox"/> MZ Mozambique                  |
| <input checked="" type="checkbox"/> AL Albania                            | <input checked="" type="checkbox"/> HR Croatia                                   | <input checked="" type="checkbox"/> NO Norway                      |
| <input checked="" type="checkbox"/> AM Armenia                            | <input checked="" type="checkbox"/> HU Hungary                                   | <input checked="" type="checkbox"/> NZ New Zealand                 |
| <input checked="" type="checkbox"/> AT Austria                            | <input checked="" type="checkbox"/> ID Indonesia                                 | <input checked="" type="checkbox"/> PL Poland                      |
| <input checked="" type="checkbox"/> AU Australia                          | <input checked="" type="checkbox"/> IL Israel                                    | <input checked="" type="checkbox"/> PT Portugal                    |
| <input checked="" type="checkbox"/> AZ Azerbaijan                         | <input checked="" type="checkbox"/> IN India                                     | <input checked="" type="checkbox"/> RO Romania                     |
| <input checked="" type="checkbox"/> BA Bosnia and Herzegovina             | <input checked="" type="checkbox"/> IS Iceland                                   | <input checked="" type="checkbox"/> RU Russian Federation          |
| <input checked="" type="checkbox"/> BB Barbados                           | <input checked="" type="checkbox"/> JP Japan                                     |  |
| <input checked="" type="checkbox"/> BG Bulgaria                           | <input checked="" type="checkbox"/> KE Kenya                                     | <input checked="" type="checkbox"/> SD Sudan                       |
| <input checked="" type="checkbox"/> BR Brazil                             | <input checked="" type="checkbox"/> KG Kyrgyzstan                                | <input checked="" type="checkbox"/> SE Sweden                      |
| <input checked="" type="checkbox"/> BY Belarus                            | <input checked="" type="checkbox"/> KP Democratic People's Republic of Korea     | <input checked="" type="checkbox"/> SG Singapore                   |
| <input checked="" type="checkbox"/> BZ Belize                             | <input checked="" type="checkbox"/> KR Republic of Korea                         | <input checked="" type="checkbox"/> SI Slovenia                    |
| <input checked="" type="checkbox"/> CA Canada                             | <input checked="" type="checkbox"/> KZ Kazakhstan                                | <input checked="" type="checkbox"/> SK Slovakia                    |
| <input checked="" type="checkbox"/> CH & LI Switzerland and Liechtenstein | <input checked="" type="checkbox"/> LC Saint Lucia                               | <input checked="" type="checkbox"/> SL Sierra Leone                |
| <input checked="" type="checkbox"/> CN China                              | <input checked="" type="checkbox"/> LK Sri Lanka                                 | <input checked="" type="checkbox"/> TJ Tajikistan                  |
| <input checked="" type="checkbox"/> CO Colombia                           | <input checked="" type="checkbox"/> LR Liberia                                   | <input checked="" type="checkbox"/> TM Turkmenistan                |
| <input checked="" type="checkbox"/> CR Costa Rica                         | <input checked="" type="checkbox"/> LS Lesotho                                   | <input checked="" type="checkbox"/> TR Turkey                      |
| <input checked="" type="checkbox"/> CU Cuba                               | <input checked="" type="checkbox"/> LT Lithuania                                 | <input checked="" type="checkbox"/> TT Trinidad and Tobago         |
| <input checked="" type="checkbox"/> CZ Czech Republic                     | <input checked="" type="checkbox"/> LU Luxembourg                                | <input checked="" type="checkbox"/> TZ United Republic of Tanzania |
| <input checked="" type="checkbox"/> DE Germany                            | <input checked="" type="checkbox"/> LV Latvia                                    | <input checked="" type="checkbox"/> UA Ukraine                     |
| <input checked="" type="checkbox"/> DK Denmark                            | <input checked="" type="checkbox"/> MA Morocco                                   | <input checked="" type="checkbox"/> UG Uganda                      |
| <input checked="" type="checkbox"/> DM Dominica                           | <input checked="" type="checkbox"/> MD Republic of Moldova                       | <input checked="" type="checkbox"/> US United States of America    |
| <input checked="" type="checkbox"/> DZ Algeria                            |  |  |
| <input checked="" type="checkbox"/> EC Ecuador                            | <input checked="" type="checkbox"/> MG Madagascar                                | <input checked="" type="checkbox"/> UZ Uzbekistan                  |
| <input checked="" type="checkbox"/> EE Estonia                            | <input checked="" type="checkbox"/> MK The former Yugoslav Republic of Macedonia | <input checked="" type="checkbox"/> VN Viet Nam                    |
| <input checked="" type="checkbox"/> ES Spain                              | <input checked="" type="checkbox"/> MN Mongolia                                  | <input checked="" type="checkbox"/> YU Yugoslavia                  |
| <input checked="" type="checkbox"/> FI Finland                            | <input checked="" type="checkbox"/> MW Malawi                                    | <input checked="" type="checkbox"/> ZA South Africa                |
| <input checked="" type="checkbox"/> GB United Kingdom                     |  | <input checked="" type="checkbox"/> ZW Zimbabwe                    |
| <input checked="" type="checkbox"/> GD Grenada                            |  |  |
| <input checked="" type="checkbox"/> GE Georgia                            |  |  |

Check-boxes below reserved for designating States which have become party to the PCT after issuance of this sheet:

- |  |  |                          |
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| <input checked="" type="checkbox"/> PH Philippines | <input checked="" type="checkbox"/> ZM Zambia  | <input type="checkbox"/> |
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**Precautionary Designation Statement:** In addition to the designations made above, the applicant also makes under Rule 4.9(b) all other designations which would be permitted under the PCT except any designation(s) indicated in the Supplemental Box as being excluded from the scope of this statement. The applicant declares that those additional designations are subject to confirmation and that any designation which is not confirmed before the expiration of 15 months from the priority date is to be regarded as withdrawn by the applicant at the expiration of that time limit. (Confirmation (including fees) must reach the receiving Office within the 15-month time limit.)

**Box No. VI PRIORITY CLAIM**

The priority of the following earlier application(s) is hereby claimed:

Filing date of earlier application (day/month/year)	Number of earlier application	Where earlier application is:		
		national application: country	regional application:* regional Office	international application: receiving Office
item (1)				
item (2)				
item (3)				
item (4)				
item (5)				

☐ Further priority claims are indicated in the Supplemental Box.

The receiving Office is requested to prepare and transmit to the International Bureau a certified copy of the earlier application(s) (only if the earlier application was filed with the Office which for the purposes of this international application is the receiving Office) identified above as:

☐ all items    ☐ item (1)    ☐ item (2)    ☐ item (3)    ☐ item (4)    ☐ item (5)    ☐ other, see Supplemental Box

\* Where the earlier application is an ARIPO application, indicate at least one country party to the Paris Convention for the Protection of Industrial Property or one Member of the World Trade Organization for which that earlier application was filed (Rule 4.10(b)(ii)): . . . .

**Box No. VII INTERNATIONAL SEARCHING AUTHORITY**

**Choice of International Searching Authority (ISA)** (if two or more International Searching Authorities are competent to carry out the international search, indicate the Authority chosen; the two-letter code may be used):

ISA / .AT

**Request to use results of earlier search; reference to that search** (if an earlier search has been carried out by or requested from the International Searching Authority):

Date (day/month/year)

Number

Country (or regional Office)

**Box No. VIII DECLARATIONS**

The following **declarations** are contained in Boxes Nos. VIII (i) to (v) (mark the applicable check-boxes below and indicate in the right column the number of each type of declaration):

Number of  
declarations

- |   |  |   |
|---|--|---|
| <input type="checkbox"/> Box No. VIII (i)   | Declaration as to the identity of the inventor   | : |
| <input type="checkbox"/> Box No. VIII (ii)  | Declaration as to the applicant's entitlement, as at the international filing date, to apply for and be granted a patent             | : |
| <input type="checkbox"/> Box No. VIII (iii) | Declaration as to the applicant's entitlement, as at the international filing date, to claim the priority of the earlier application | : |
| <input type="checkbox"/> Box No. VIII (iv)  | Declaration of inventorship (only for the purposes of the designation of the United States of America)                               | : |
| <input type="checkbox"/> Box No. VIII (v)   | Declaration as to non-prejudicial disclosures or exceptions to lack of novelty   | : |

**Box No. IX CHECK LIST; LANGUAGE OF FILING**

This international application contains:

(a) the following number of sheets in paper form:

request (including declaration sheets) : 5  
 description (excluding sequence listing part) : 17  
 claims : 4  
 abstract : 1  
 drawings : 5

Sub-total number of sheets : 32

sequence listing part of description (actual number of sheets if filed in paper form, whether or not also filed in computer readable form; see (b) below) :

Total number of sheets : 32

(b) sequence listing part of description filed in computer readable form

- (i) ☐ only (under Section 801(a)(i))  
 (ii) ☐ in addition to being filed in paper form (under Section 801(a)(ii))

Type and number of carriers (diskette, CD-ROM, CD-R or other) on which the sequence listing part is contained (additional copies to be indicated under item 9(ii), in right column):

This international application is accompanied by the following item(s) (mark the applicable check-boxes below and indicate in right column the number of each item):

- |   |   |   |
|---|---|---|
| 1. <input checked="" type="checkbox"/> fee calculation sheet  | : | 1 |
| 2. <input type="checkbox"/> original separate power of attorney   | : |   |
| 3. <input type="checkbox"/> original general power of attorney  | : |   |
| 4. <input type="checkbox"/> copy of general power of attorney; reference number, if any: .....  | : |   |
| 5. <input type="checkbox"/> statement explaining lack of signature  | : |   |
| 6. <input type="checkbox"/> priority document(s) identified in Box No. VI as item(s): .....   | : |   |
| 7. <input type="checkbox"/> translation of international application into (language): .....   | : |   |
| 8. <input type="checkbox"/> separate indications concerning deposited microorganism or other biological material  | : |   |
| 9. <input type="checkbox"/> sequence listing in computer readable form (indicate also type and number of carriers (diskette, CD-ROM, CD-R or other))  | : |   |
| (i) <input type="checkbox"/> copy submitted for the purposes of international search under Rule 13ter only (and not as part of the international application)   | : |   |
| (ii) <input type="checkbox"/> (only where check-box (b)(i) or (b)(ii) is marked in left column) additional copies including, where applicable, the copy for the purposes of international search under Rule 13ter | : |   |
| (iii) <input type="checkbox"/> together with relevant statement as to the identity of the copy or copies with the sequence listing part mentioned in left column  | : |   |
| 10. <input type="checkbox"/> other (specify): PF48  | : | 1 |

Figure of the drawings which should accompany the abstract: 1A

Language of filing of the international application: English

**Box No. X SIGNATURE OF APPLICANT, AGENT OR COMMON REPRESENTATIVE**

Next to each signature, indicate the name of the person signing and the capacity in which the person signs (if such capacity is not obvious from reading the request).



Dr. TIMOTHY L. WATKIN

AGENTS FOR THE APPLICANTS

For receiving Office use only

1. Date of actual receipt of the purported international application: 07 FEB 2002 (07-02-02)	2. Drawings: <input type="checkbox"/> received:  <input type="checkbox"/> not received:
3. Corrected date of actual receipt due to later but timely received papers or drawings completing the purported international application:	
4. Date of timely receipt of the required corrections under PCT Article 11(2):	
5. International Searching Authority (if two or more are competent): ISA / AI	
6. <input type="checkbox"/> Transmittal of search copy delayed until search fee is paid	

For International Bureau use only

Date of receipt of the record copy by the International Bureau:

**A PORTABLE DATA STORAGE AND IMAGE RECORDING DEVICE  
CAPABLE OF DIRECT CONNECTION TO A COMPUTER USB PORT**

5                   **CROSS REFERENCE TO RELATED APPLICATIONS**

The present application is related to the following United States patent applications, which applications are owned by the owner of the present invention and which applications are incorporated by reference in their entirety

10    herein:

U.S. Patent Application Serial No. 09/803,173, entitled "PORTABLE DATA STORAGE DEVICE CAPABLE OF BEING DIRECTLY CONNECTED VIA USB PLUG TO A COMPUTER" (Attorney Docket No. 1601457-0004);

15           U.S. Patent Application Serial No. 09/803,157, entitled "PORTABLE DATA STORAGE DEVICE HAVING SECURE MODE OF OPERATION" (Attorney Docket No. 1601457-0005);

U.S. Patent Application Serial No. 09/898,365, entitled "A PORTABLE DEVICE HAVING BIOMETRICS-BASED AUTHENTICATION CAPABILITIES" (Attorney Docket No. 1601457-0007); and

20           U.S. Patent Application Serial No. 09/898,310, entitled "A PORTABLE DEVICE HAVING BIOMETRICS-BASED AUTHENTICATION CAPABILITIES" (Attorney Docket No. 1601457-0008).



## BACKGROUND OF THE INVENTION

### Field of the Invention

The present invention relates to a portable storage device, and in particular to a portable storage device having image and/or audio capture capabilities.

### Description of the Related Art

Portable data storage devices have become a class of indispensable peripherals that are widely utilized in business, educational and home computing. These devices are generally not permanently fitted to a particular host platform, such as a personal computer (PC). Rather, they can be conveniently removed from and attached to any computer having the appropriate connection port (e.g., a serial bus port like a USB port or an IEEE 1394 ("Firewire") port). Thus, these portable data storage devices enable a user to transfer data among different computers that are not otherwise connected. A popular type of portable storage device utilizes a non-volatile solid-state memory (e.g., flash memory) as the storage medium and so does not require moving parts or a mechanical drive mechanism for accessing the data. The absence of a drive mechanism enables these portable solid-state memory devices to be more compact than surface storage devices such as magnetic disks and CD-ROMs.

Portable devices such as digital cameras are known for acquiring images and processing/storing the images in a digital format. In general, devices such as digital cameras focus an image via a lens on the surface of an image-sensing device such as a charge-coupled device (CCD) or a MOS-

type image photographing element. The image-sensing device converts the optical image into electrical signals representative of the image. The electrical signals are then digitized through an A/D converter. Thereafter, the image may be processed to optimize visual aspects of the image and/or stored, typically on a flash memory card. A conventional digital camera is disclosed for example in U.S. Patent No. 6,208,380 B1 to Misawa, which patent is hereby incorporated by reference in its entirety herein.

It is known to download images from a digital camera to a host platform such as a PC for further processing, viewing, printing, etc. However, many digital camera manufacturers use proprietary standards in the physical interface between the camera and host computer, and/or in the creation and storage of the image within the camera. In the event such proprietary standards are used, proprietary hardware and/or software are required on the host platform in order to download and process digital images from the camera to the host platform. For example, U.S. Patent No. 6,111,604 to Hashimoto et al. discloses a system for connecting a digital camera to a host computer and for converting the image signals from within the camera to a format compatible with the host platform.

#### **SUMMARY OF THE INVENTION**

It is therefore an advantage of the present invention to provide a method and system for capturing image and/or audio information and storing the information on a portable storage medium.

It is another advantage of the present invention to provide a method and system for downloading image and/or audio information from a device

that is compatible with the universal serial bus (USB) standard.

It is a further advantage of the present invention to provide a method and system for storing image and/or audio information in a format which is compatible with standard software protocols on a host platform such as an  
5 IBM PC or an Apple Macintosh PC.

These and other advantages are provided by the present invention which in preferred embodiments relates to a system and method for capturing image and/or audio data, processing the image and/or audio data, and storing the processed image and/or audio data. The system includes a portable  
10 device having a digital camera for capturing the image and/or audio data, an integrated circuit having a microprocessor for processing the image and/or audio data and a non-volatile memory for storing the processed image and/or audio data. In a preferred embodiment, the non-volatile memory comprises flash memory.

15 In a preferred embodiment, the portable device is compatible with the universal serial bus (USB) standard and includes a USB connector. In this embodiment, the integrated circuit includes a USB device controller, which serves to control the communication between the portable device and the host platform.

20 As part of the processing operation in a preferred embodiment, the data is converted into a standard file format that is compatible and recognizable by the host platform to which the portable device may be coupled. After conversion into a standard file format, the data may either be stored in the non-volatile memory, or uploaded directly to the host platform.

25 The standard file formats for storing still image data include but are not limited

to JPEG, GIF and PICT II. Standard file formats for storing continuous video and/or audio data include but are not limited to MPEG file formats.

### **BRIEF DESCRIPTION OF THE DRAWINGS**

5       The accompanying drawings, which are incorporated in and constitute a part of this specification, illustrate several embodiments of the invention and, together with the description, serves to explain the principles of the invention.

10       Figure 1A is a block diagram illustrating functional blocks of one embodiment of the portable device of the present invention and an illustrative operational configuration thereof.

Figure 1B is a block diagram illustrating functional blocks of another embodiment of the portable device of the present invention.

15       Figure 2 is a front perspective view of a portable device with an integrated digital camera module in accordance with one embodiment of the present invention.

20       Figure 3 is a front perspective view of an alternative embodiment of the present invention with the portable device coupled to the host platform via a flexible communications cable having a USB compatible plug for being received in the USB port of a host platform.

25       Figure 4 is a front perspective view of a further alternative embodiment of the present invention with the integrated circuit portion of the portable device coupled directly to the USB port of a host platform, and the digital camera module of the portable device connected to the integrated circuit portion via a flexible communications cable.

**DETAILED DESCRIPTION**

The present invention now will be described more fully with reference to Figures 1A through 4, in which preferred embodiments of the invention are shown. The present invention may, however, be embodied in many different  
5 forms and should not be construed as being limited to the embodiments set forth herein; rather these embodiments are provided so that this disclosure will be thorough and complete and will fully convey the invention to those skilled in the art. Indeed, the invention is intended to cover alternatives, modifications and equivalents of these embodiments, which will be included  
10 within the scope and spirit of the invention as defined by the appended claims. Furthermore, in the following detailed description of the present invention, numerous specific details are set forth in order to provide a thorough understanding of the present invention. However, it will be clear to those of ordinary skill in the art that the present invention may be practiced without  
15 such specific details. In other instances, well known methods, procedures, components, and circuits have not been described in detail as not to unnecessarily obscure aspects of the present invention.

Figure 1A is a block diagram illustrating functional blocks of one embodiment of the portable device of the present invention and an illustrative  
20 operational configuration thereof. Figure 1A shows a portable device 70 coupled to a host platform 95. In this embodiment, host platform 95 is coupled to a power supply circuit 80 located in portable device 70. Power supply circuit 80 draws power from host platform 95 and serves as a power source for various components of portable device 70. It is understood that in  
25 alternative embodiments, portable device 70 may include its own on-board

power supply, thereby enabling operation of portable device 70 independently of the host platform. Such on-board power supplies are known in the art and may comprise, for example, rechargeable lithium ion batteries.

Referring still to Figure 1A, portable device 70 further includes an  
5 integrated circuit 10, a flash memory 20, a volatile memory 30 and a digital camera module 50. Integrated circuit 10 can be conveniently implemented as an application-specific integrated circuit (ASIC). In a currently preferred embodiment, flash memory 20 can have a storage capacity between 8 MB and 512 MB for storing image and/or audio data generated by camera module  
10 50 in accordance with the present invention as described below. In one embodiment, volatile memory 30 is external to integrated circuit 10 and can comprise either a dynamic random access memory (DRAM) or a static random access memory (SRAM). Among other uses, volatile memory 30 can serve as an initial storage and staging area for image and/or audio data  
15 captured in accordance with the present invention. Integrated circuit 10 comprises a microprocessor 11 which, in one embodiment, is a RISC processor.

Referring still to Figure 1A, integrated circuit 10 further includes a bus  
interface 13 which facilitates communication between integrated circuit 10 and  
20 other components, such as volatile memory 30. Integrated circuit 10 further includes a flash controller 14 for controlling access to flash memory 20. Moreover, in a currently preferred embodiment, portable device 70 is compatible with the universal serial bus (USB) standard and includes a USB connector (not shown). In this embodiment, integrated circuit 10 also includes  
25 a USB device controller 15, which serves to control the communication

between portable device 70 and host platform 95, such as a USB-compatible personal computer (PC) having a USB host controller 93 therein.

With reference still to Figure 1A, integrated circuit 10 also includes a volatile memory 16 and a non-volatile memory 17. In a preferred embodiment, volatile memory 16 is a random access memory (RAM) that serves as a working memory for microprocessor 11 during its operation. Non-volatile memory 17 is a read-only memory (ROM) in this embodiment and can be used to store firmware that perform various functions of portable device 70. Integrated circuit 10 further includes a JPEG Encoder-Decoder (CODEC) 12, which serves to compress image data in accordance with any of various known image file format compression algorithms. These file format algorithms include the Joint Photographic Experts Group (JPEG) file format, the Graphics Interchange Format (GIF) file format, and the PICT II file format (for Apple Macintosh computers). Where the data comprises video image and audio data (explained below), the data may be compressed in accordance with the Movie Picture Experts Group (MPEG) file format. The degree to which the image data is compressed may be selected by the operator, for example, using an operator control panel 68 in digital camera module 50 as described below. In one embodiment, the compressed data is sent via RAM 16 and then through USB device controller 15 to host platform 95. In another embodiment, the compressed data is sent via RAM 16 and then through flash controller 14 to flash memory 20 for storage.

Additionally, integrated circuit 10 includes an optional error checking (ECC) engine 19 for performing various error checking tasks during the operation of portable device 70. It should be appreciated that ECC engine 19

is well-suited to numerous implementations within the scope of the present invention. For example, ECC engine 19 can be implemented by software (e.g., firmware stored in a non-volatile memory), as part of microprocessor 11, or as a processor unit separate from microprocessor 11.

5       The internal components of camera module 50 are of conventional design. In general, an image is focused on the surface of an image-sensing device 52 via an optical lens 54. Image-sensing device 52 may be a charge-coupled device (CCD) or a MOS-type image photographing element. It may alternatively be an infrared (IR) or ultraviolet (UV) sensing device for camera  
10       embodiments intended to capture images beyond the visible light spectrum. The analog raw image data received from image-sensing device 52 is passed to an analog processing circuit 56 which may include a CDS clamp circuit, a gain adjustment circuit, a color balance circuit and various other systems for performing known image checking and enhancement functions. The output  
15       from analog processing circuit 56 is digitized by an A/D converter 58 and forwarded to a digital image processing circuit 60 for processing as explained hereinafter.

      The CCD is driven by a CCD driver 62, which driver is synchronized with analog processing device 56 and A/D converter 58 by a timing signal  
20       generated by a timing generator 64 in a known manner. Timing generator 64 is controlled by a camera microprocessor 66. Camera module 50 may further include an operator control panel 68 for allowing a camera operator to manually select between various modes and functions of the camera module, including for example image resolution, image magnification, still frame or  
25       continuous video, etc. Operator-selected modes and functions are



communicated from control panel 68 to camera microprocessor 66. Information from microprocessor 66 is also communicated to control panel 68 for display to the operator over an LCD (not shown) on panel 68, such as the amount of available space in memory and battery charge status.

5 Microprocessor 66 also performs monitoring functions which are communicated to operator control panel 68. For example, in the case of an error in the operation of any of the above-described camera module components, microprocessor 66 can cause an error message to be displayed on the LCD of panel 68. Operator control panel 68 may also include an image  
10 capture button (not shown) for activating the image capture operation described above.

Those of skill in the art would appreciate that camera module 50 may capture still images and/or continuous video. For embodiments where camera module 50 captures continuous video, module 50 may further include  
15 an acoustic digitizer circuit (not shown) for digitizing sound recorded by a microphone in module 50. The digitized sound data associated with each image can be stored in flash memory 20 along with the digitized image information. As is known in the art, stored digital image data may be marked with the address of the corresponding digitized sound data, so that both the  
20 image and sound data may appear together when played back.

It is understood that the above description is merely by way of example, and that camera module 50 may include a variety of other and/or alternative known components and features in embodiments of the invention. Some of these known additional and/or alternative components and features  
25 are described in the following U.S. patents, each of which is incorporated by

reference in its entirety herein: U.S. Patent No. 6,239,837 B1 to Yamada et al.; U.S. Patent No. 6,208,380 B1 to Misawa; U.S. Patent No. 6,031,964 to Anderson; U.S. Patent No. 5,859,666 to Manabe; U.S. Patent No. 5,528,293 to Watanabe.

5        Digital image processing circuit 60 receives the digitized image information from analog processing circuit 56 and A/D converter 58 and processes the image so that it may be stored in flash memory 20 of integrated circuit 10 in a format that is compatible with host platform 95. By storing the image data in a format compatible with the host platform (e.g., in Windows  
10    FAT format where the host platform runs on the Windows operating system), the present invention eliminates the need for a proprietary software interface on the host platform, further enhancing the user-friendliness of the present invention. As is known in the art, digital processing circuit 60 may include processing circuits such as for example a luminance signal generating circuit,  
15    a color difference signal generating circuit and a gamma correcting circuit, such as described in U.S. Patent No. 6,208,380 previously incorporated by reference. It is further contemplated that digital processing circuit 60 can be implemented as software (e.g., firmware) or hardware (e.g., processor/processor module) within the scope of the present invention.

20        Once the image and/or audio data is formatted by the digital processing circuit 60, the data is forwarded to the integrated circuit 10 for compression and storage as described above. In a preferred embodiment, digital processing circuit 60 sends the formatted image data via volatile memory 30, which acts as a buffer, to integrated circuit 10. JPEG CODEC 12  
25    of integrated circuit 10 receives the image data from volatile memory 30 and

performs any necessary compression. The processing of the data by digital processing circuit 60 in camera module 50 as described above allows the image and/or audio data to be stored in a format recognized by and compatible with host platform 95. Thus, as portable device 70 fits into the USB port of host platform 95, and as the data is stored in a file format compatible with host computer 95, no proprietary hardware or software is required on host platform 95 in order to download and process image or audio data from portable device 70 to host platform 95. It is understood that upon formatting of the data into a standard format, the data may either be stored in flash memory 20 as described above, or the data may be uploaded directly to host platform 95 for playback, further processing or storage within the host platform's memory.

Reference is now made to Figure 1B, which is a block diagram illustrating functional blocks of another embodiment of the portable device of the present invention. In this embodiment, portable device 170 is compatible with the USB standard and includes a USB plug 118 which, as Figure 1B shows, is coupled to a USB host controller 193 of a host platform 195. Optionally, portable device 170 further includes an additional USB port 162 that is coupled to USB plug 118. USB port 162 is provided as a convenient feature that can be used to couple other USB-compatible device(s) to the USB via portable device 170. In this embodiment, portable device 170 also includes a USB device controller 115 for controlling the communication between portable device 170 and host platform 195 via USB host controller 193. Portable device 170 further comprises an integrated circuit 110, a flash memory 120, a volatile memory 130 and a camera module 150. Integrated

circuit 110 can be conveniently implemented as an ASIC. In one embodiment, volatile memory 130 comprises either a DRAM or a SRAM, which serves as an initial storage area for image and/or audio data captured in accordance with the present invention.

5 Referring still to Figure 1B, integrated circuit 110 comprises a microprocessor 111 which preferably is a RISC processor. Integrated circuit 110 further includes a flash controller 114 for controlling access to flash memory 120 and a memory controller 133 for controlling access to volatile memory 130. Integrated circuit 110 also includes a volatile memory 116 and  
10 a non-volatile memory 117. Preferably, volatile memory 116 comprises a RAM for use as a working memory for microprocessor 111 during its operation, while non-volatile memory 117 comprises a ROM for storing firmware that perform various functions of portable device 170. It should be appreciated that in an alternative embodiment of the present invention, such  
15 firmware may be stored in a non-volatile memory within the host platform rather than in portable device 170. Integrated circuit 110 further includes a JPEG CODEC 112 for compressing image data in accordance with any of various known image file format compression algorithms, such as the JPEG file format, the GIF file format, and the PICT II file format. Where the data  
20 comprises video image and audio data, the data may be compressed in accordance with the MPEG file format. The degree of data compression may be selected by the operator via a user interface in digital camera module 150 as explained below. In one embodiment, the compressed data is sent via RAM 116 and then through USB device controller 115 to host platform 195.  
25 In another embodiment, the compressed data is sent via RAM 116 and then

through flash controller 114 to flash memory 120 for storage.

Additionally, integrated circuit 110 includes an optional error checking (ECC) engine 119 for performing various error checking tasks during the operation of portable device 170. It should be appreciated that ECC engine  
5 119 can be implemented as software (e.g., firmware) or hardware (e.g., processor/processor module) within the scope of the present invention.

In a currently preferred embodiment as illustrated in Figure 1B, microprocessor 111 controls various components of portable device 170, including flash controller 114, USB device controller 115, RAM 116, ROM 117  
10 (and execution of firmware code stored therein), JPEG CODEC 112, ECC engine 119 and memory controller 133. In this embodiment, portable device 170 also includes a write-protection switch 140 which triggers microprocessor 111 to disable read and write-access to flash memory 120 when activated.

The camera module 150 in the embodiment of Figure 1B operates as  
15 in the camera module 50 in the embodiment of Figure 1A, with like elements having reference numerals incremented by 100 in Figure 1B.

With reference next to Figure 2, a front perspective view of a portable storage device and digital camera in accordance with one embodiment of the present invention is shown. In Figure 2, portable device 170 is shown with  
20 USB connector 118 protruding from its front end. Camera module 150 is shown as being structurally integrated with portable device 170 in a unitary construction. Optical lens 154, an image capture button 169 and write-protection switch 140 are also shown. In this embodiment, USB connector 118 couples directly to the USB port of host platform 195.

25 In an alternative embodiment of the present invention shown in the

front perspective view of Figure 3, a portable device 370 may be coupled to a host platform 395 via a flexible communications cable 342 having a USB plug 318 at its end for being received in the USB port of host platform 395. This allows greater flexibility in the capture of image and/or audio data.

5 In a further alternative embodiment of the present invention shown in the front perspective view of Figure 4, an integrated circuit portion 410 of a portable device 470 may be coupled directly to the USB port of a host platform 495, and a digital camera module 450 of portable device 470 may be connected to integrated circuit portion 410 via a flexible communications cable  
10 444. This embodiment also provides a high degree of flexibility with respect to image and/or audio data capture.

U.S. Patent Application Serial No. 09/898,365 (the "'365 application"), entitled "A PORTABLE DEVICE HAVING BIOMETRICS-BASED AUTHENTICATION CAPABILITIES," which application has previously been  
15 incorporated by reference herein and which application is assigned to the owner of the present application, describes a portable memory device wherein memory may be accessed only upon proper authentication of the operator. In particular, the invention recited in the '365 application accepts identification information, such as a fingerprint, which is digitized and compared to an  
20 identification template stored in memory.

In an alternative embodiment, portable device 70 described above in accordance with the present invention may operate to accept identification information for authentication purposes as described in the '365 application. In particular, during an initial configuration process, a unique image, such as  
25 for example that of the operator's face, is captured by camera module 50 as

described above. The image, or select portions of the image, are digitized, processed and stored as templates in a reserved area of flash memory 20. The stored template may alternatively be audio data.

Thereafter, before access to flash memory 20 is allowed, camera  
5 module 50 accepts image and/or audio information which is digitized and processed as described above. Some or all of this digital image and/or audio information is then compared against the stored image and/or audio template. Access to the information in the flash memory and/or host platform is only granted upon confirmation that the input image and/or audio information  
10 matches that in flash memory 20.

In a further alternative embodiment, graphical templates may be stored in a reserved area of flash memory 20, and added to an image captured by portable device 70. Such graphical templates can include borders, backgrounds and text. The image may be stored in flash memory 20 with or  
15 without the added graphical template.

In a still further embodiment of the present invention, portable device 70 may be used as a scanner, receiving an image and then storing the image in memory as described above. Such an embodiment may utilize known optical character recognition (OCR) algorithms to receive images including  
20 text and then translate the image into text files recognizable by conventional word processing programs. Such OCR algorithms may be resident in a reserved area of flash memory 20.

While preferred embodiments of the present invention have been described herein as using flash memory as a storage media, it should be  
25 appreciated that other types of non-volatile memory, such as ferroelectric

random access memory (FRAM) or magnetic random access memory (MRAM), can also be used within the scope of the present invention. In addition, while such preferred embodiments have been described herein as being compatible with the USB standard, the portable device of the present invention is not intended to be restricted thereto. Rather, the present invention is intended to encompass portable devices that support other communication protocols and/or bus standards, such as the IEEE 1394 ("Firewire") standard.

While preferred embodiments of the present invention have been described, it is understood that those skilled in the art, both now and in the future, may make various improvements and enhancements which fall within the scope of the claims that follow. These claims should be construed to maintain the proper protection for the invention first disclosed herein.



**CLAIMS**

What is claimed is:

1. A portable device capable of operation with a host platform, the portable device comprising:
  - a coupling device for coupling the portable device to a serial bus of the host platform;
  - a non-volatile memory in communication with said coupling device;
  - a digital camera, integrally formed with said non-volatile memory, for capturing image and/or audio information, said non-volatile memory capable of storing said image and/or audio information; and
  - a microprocessor for at least in part formatting said image and/or audio information in a standard image and/or audio file format compatible with the host platform.
2. A portable device as recited in claim 1, said non-volatile memory comprising flash memory.
3. A portable device as recited in claim 1, said coupling device capable of coupling to a USB port of the host platform.
4. A portable device as recited in claim 1, said standard image and/or audio file format comprising a JPEG file format.

5. A portable device as recited in claim 1, said standard image and/or audio file format comprising a GIF file format.
6. A portable device as recited in claim 1, said standard image and/or audio file format comprising a PICT II file format.
7. A portable device as recited in claim 1, said standard image and/or audio file format comprising an MPEG file format.
8. A portable device as recited in claim 1, further comprising a power supply circuit for receiving power from the host platform and providing said power to components of the portable device.
9. A portable device as recited in claim 1, further comprising a power source for providing power to components of the portable device.
10. A portable device capable of operation with a host platform, the portable device comprising:
  - a coupling device for coupling the portable device to a serial bus of the host platform;
  - a non-volatile memory in communication with said coupling device;

a digital camera for capturing image and/or audio information, said non-volatile memory capable of storing said image and/or audio information;

a flexible communications cable for coupling said digital camera to said non-volatile memory, said flexible communications cable allowing said digital camera to move with respect to said non-volatile memory.

11. A portable device as recited in claim 10, further comprising a microprocessor for at least in part formatting said image and/or audio information in a standard image and/or audio file format compatible with the host platform.
12. A method of capturing image and/or audio information and uploading the image and/or audio information to a host platform, comprising the steps of:
  - (a) capturing image and/or audio data;
  - (b) digitizing said image and/or audio data captured in said step (a);
  - (c) processing said image and/or audio data digitized in said step (b) into a form compatible with the host platform; and
  - (d) uploading said image and/or audio data to the host platform via a coupling to a serial port of the host platform.

13. A method of capturing image and/or audio information as recited in claim 12, further comprising a step (e) of storing said image and/or audio data in a volatile memory.

14. A method of authenticating an operator seeking access to information on a storage medium, comprising the steps of:

(a) capturing image and/or audio identification data via a digital camera;

(b) comparing at least portions of said image and/or audio data against a template stored in a memory; and

(c) allowing access to the information if the image and/or audio identification data matches the stored template upon comparison in said step (b).

**A PORTABLE DATA STORAGE AND IMAGE RECORDING DEVICE  
CAPABLE OF DIRECT CONNECTION TO A COMPUTER USB PORT**

**ABSTRACT**

5           A system and method are disclosed for capturing image and/or  
audio data, processing the image and/or audio data, and storing the  
processed image and/or audio data. The system includes a portable  
device having a digital camera for capturing the image and/or audio  
data, an integrated circuit having a microprocessor for processing the  
10 image and/or audio data and a non-volatile memory for storing the  
processed image and/or audio data. As part of the processing operation  
in a preferred embodiment, the data is converted into a standard file  
format that is compatible and recognizable by the host platform to which  
the portable device may be coupled. After conversion into a standard  
15 file format, the data may either be stored in the non-volatile memory, or  
uploaded directly to the host platform.

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FIGURE 1A

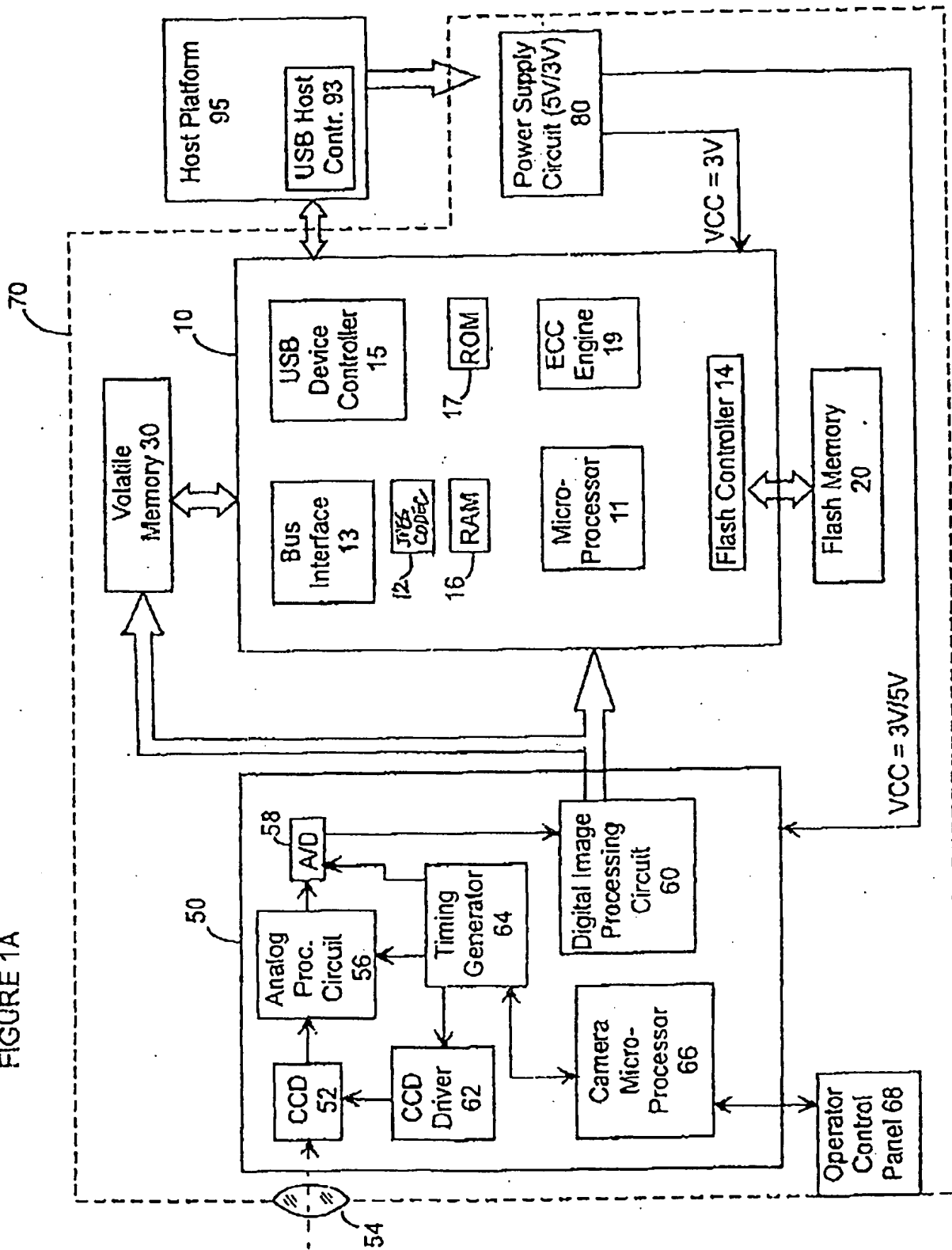
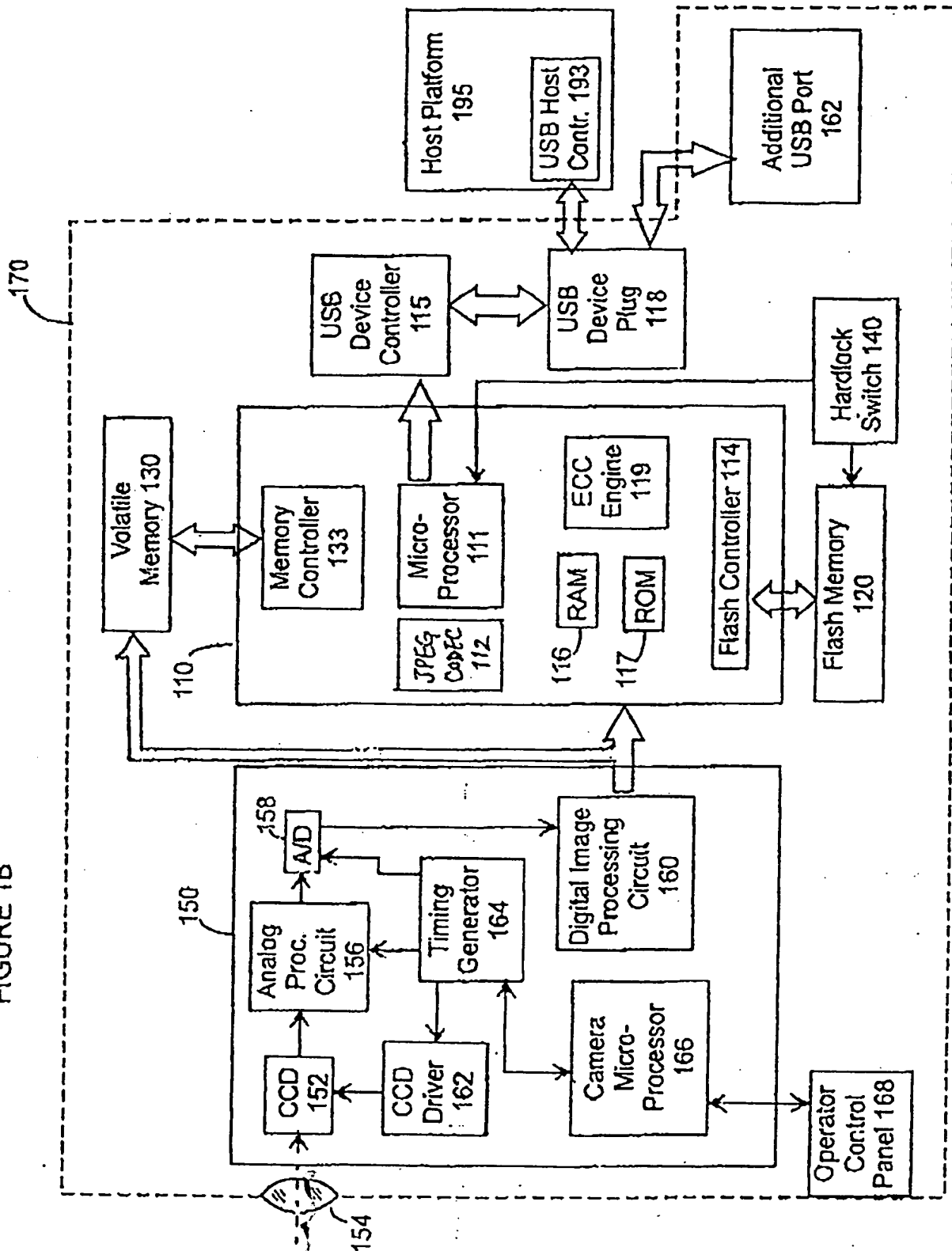


FIGURE 1B



170

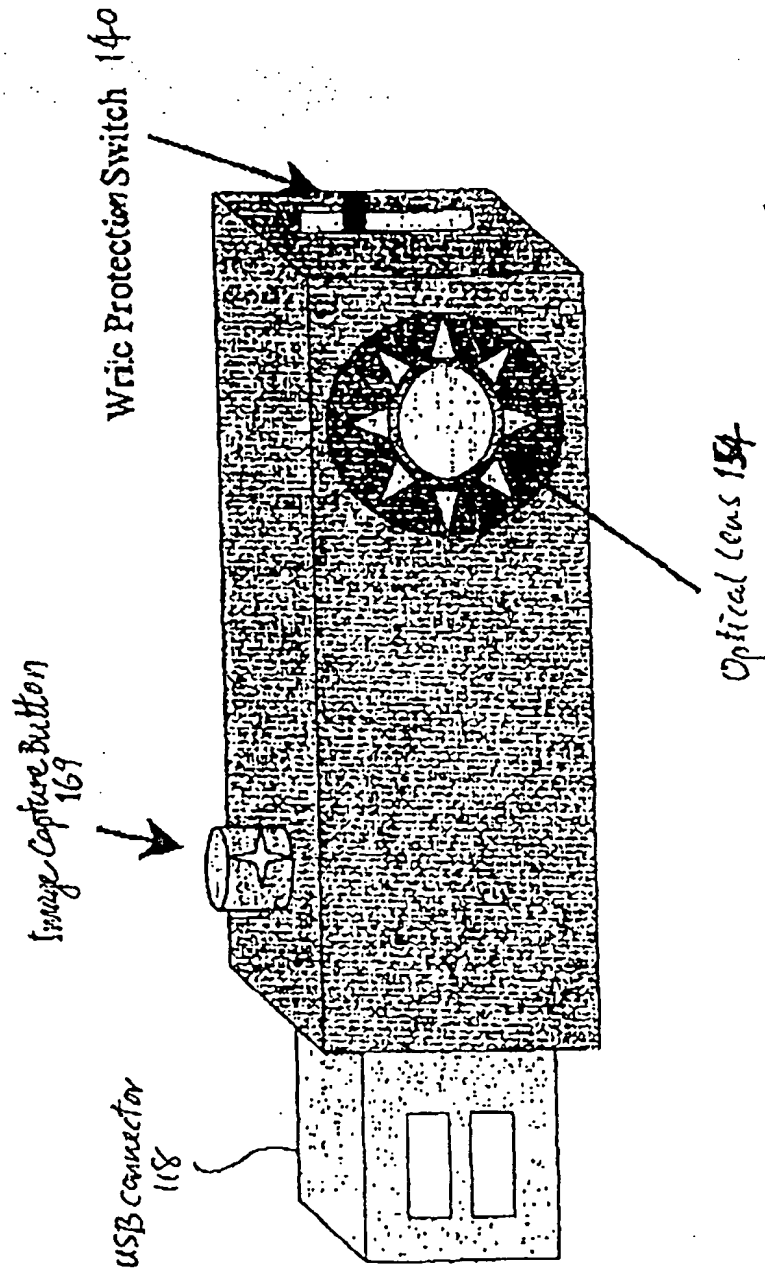


FIGURE 2



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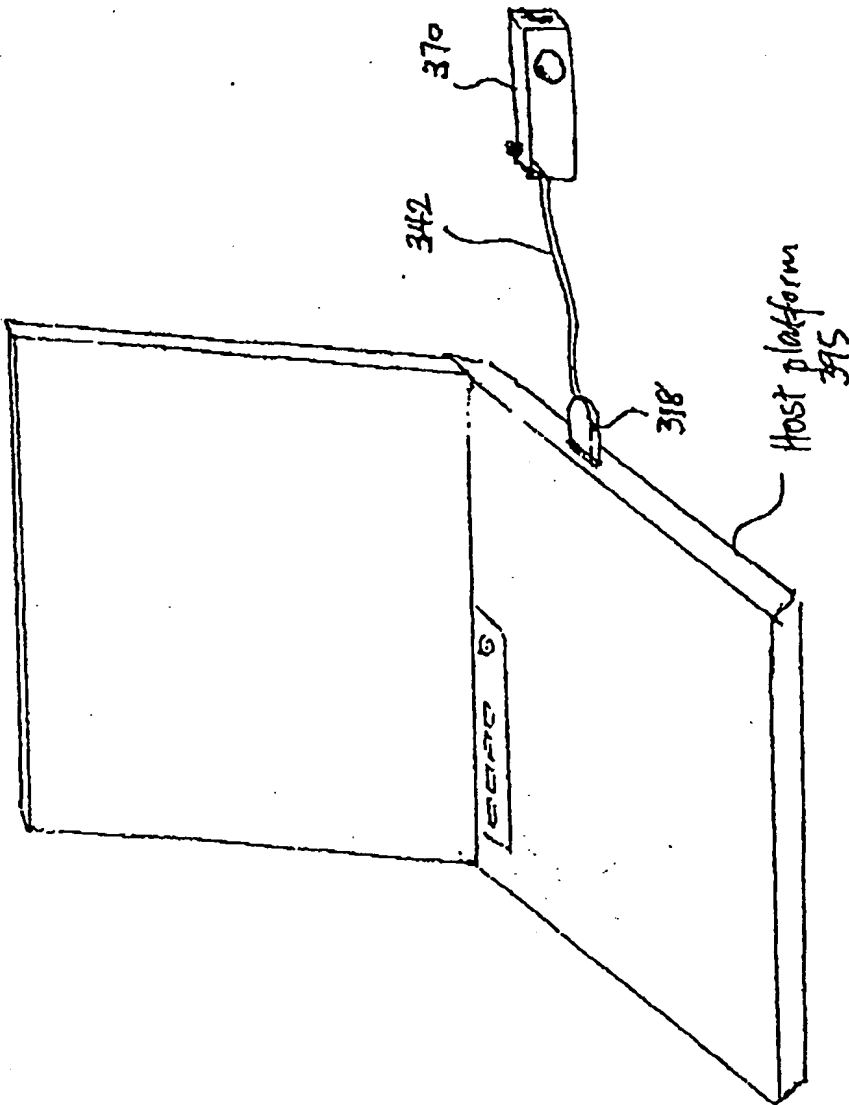


FIGURE 3

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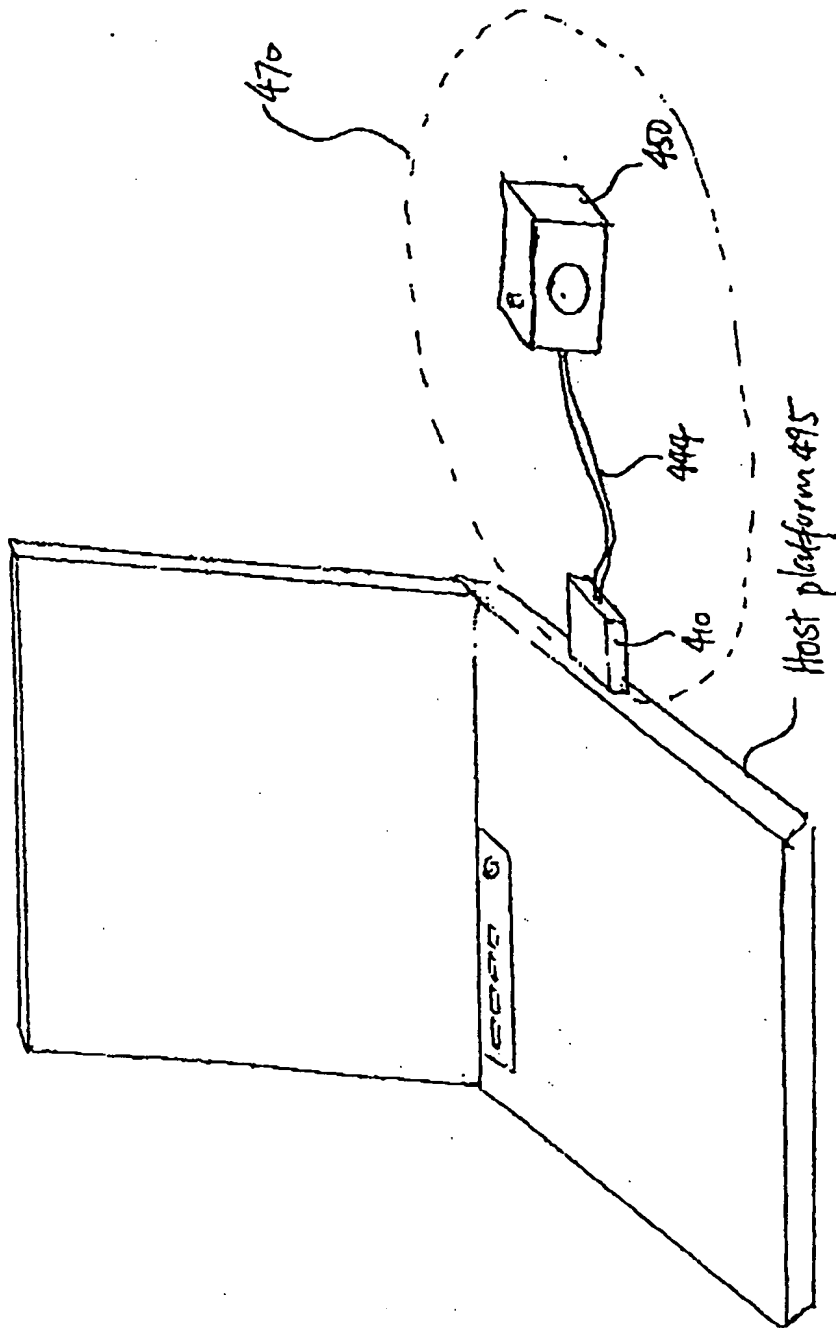


FIGURE 4